

Dr. Kwon's Golf Biomechanics Instructor Training Program - Level 2

Course Outline

(Last updated in January 2018)

Objectives

- To share data collected from elite golfers with golf practitioners
- To provide the generalized patterns, descriptive statistics (means and standard deviations), and correlation profiles of key kinematic & kinetic parameters
- To identify important performance variables through data analysis
- To promote evidence-based practices by eliminating misconceptions and misunderstanding on golf swing

Class 1. Introduction

- Current database
- Two additional players: Jamie Sadlowski & Bryson DeChambeau
- Data collection procedures
- Statistical methods used
 - Normal distribution
 - Correlation analysis

Class 2: Temporal Profiles

- Event times
- LBA-LB vs. LB-LBA sequence
- Phase times
- EPR-TB vs. TB-EDA time

Class 3: Functional swing plane

- Slope
 - Correlation to body height
- Direction
- Position
- Clubhead and hand deviations
- Swing style classification based on FSP
 - Planar
 - Spiral
 - Reverse spiral
- Hand plane vs. FSP
 - Square
 - Out
 - In

Class 4: Body CM motion

- Linear motion components
 - Forward/backward
 - Toward/away
 - Up/downward
- Horizontal motion ranges
 - Away
 - Toward
- Vertical motion ranges
 - Upward-BS
 - Downward
 - Upward-DS
- Low point position

Class 5: Pelvis & thorax motions

- Pelvis CM horizontal motion ranges
- Pelvis CM vertical motion ranges
- Pelvis CM forward/backward motion ranges
- Definitions of the pelvis orientation angles
- Pelvis L/R rotation ranges & positions
- Pelvis lateral tilt ranges
- Pelvis P/A tilt ranges
- Definitions of the thorax orientation angles
- Thorax L/R rotation ranges & positions

Class 6: On-plane motion

- Definitions of the on-plane angles
- Shoulder line motion ranges & positions
- Hip line motion ranges & positions
- Upper lever angular positions
- Lower lever (wrist cock) angular positions
- X-factor
 - Summary of X-factor studies
 - X-factor data
 - X-factor stretch data

Class 7: Kinematic sequence

- Definitions of angular velocities
- Peak angular velocities
 - Hip line/pelvis
 - Thorax
 - Shoulder line
 - Upper lever

- Lower lever (wrist)
- Club
- Angular decelerations
- Peak angular speed times
- Normal vs. abnormal sequence
- Transition times
- Early release vs. late release

Class 8: Ground reaction force

- Peak forward/backward forces
 - Combined, lead & trail foot forces
- Peak toward/away forces
 - Combined, lead & trail foot forces
- Peak vertical forces
 - Combined, lead & trail foot forces
 - Unweighing

Class 9: Foot-ground interaction moments

- Definitions of the F-G interaction moments
- Peak frontal plane GRF moments
 - Combined, lead, and trail
- Frontal plane moments at events
- Swing style classification based on the frontal plane GRF moment pattern
 - Moment arm-dominant
 - Force-dominant
 - Hybrid
 - Dual-peak styles
- Peak ground reaction moments
- Peak pivoting moments
 - Combined & trail

Class 10: Center of pressure motion

- Peak COP positions
- COP positions at events
- Peak COP velocity

Class 11: Mid-hand kinetics

- Definitions of mid-hand force & moment
- Moving mid-hand reference frame
- Nesbit & McGinnis (2009)
- Peak mid-hand forces
 - Tangential
 - Normal-outward
 - Normal-inward
- Peak mid-hand force times
 - Tangential
 - Normal-outward
- Outward-inward transition time
- Peak mid-hand moment
 - Swing (in-plane) moment
 - Mid-hand moment (swing torque) values & patterns
- Peak swing moment time
- Uncocking-cocking transition time

Summary and Closing

- Summary of key swing parameters
- References
- Q & A

Typical Course Schedule-Level 2

Day 1

- 8:30-9:00a Registration
- 9:00a-12:30p Lecture
- 12:30-1:30p Lunch
- 1:30-6:00p Lecture

Day 2

- 9:00a-12:30p Lecture
- 12:30-1:30p Lunch
- 1:30-3:30p Lecture
- 3:30-4:00p Closing